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CARDIAC FUNCTION AND HEART FAILURE

DIASTOLIC FUNCTION ALONG THE DIABETIC SPECTRUM

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Background: Hyperglycemia and insulin resistance have been linked to diastolic dysfunction experimentally. We sought to investigate the association between glucose metabolism and diastolic function along the whole spectrum of glucose metabolism states.

Methods: In the observational Diast-CHF trial, patients with risk factors for or with manifest heart failure were included. We examined a subgroup of patients classified by oral glucose tolerance test and history as normal (n=343), prediabetic (n=229), non-insulin dependent (NIDDM, n=335) or insulin-dependent (IDDM, n=178) diabetic with comprehensive echocardiography at baseline including tissue doppler techniques.

Results: While ejection fraction did not differ, markers of diastolic function significantly worsened across groups. Prediabetes represented an intermediate between normal glucose metabolism and diabetes with regard to echocardiographic changes. Prevalence and severity of diastolic dysfunction increased significantly ($p<0.001$) along the diabetic spectrum. State of glucose metabolism was significantly associated with prevalence of diastolic dysfunction on multivariate logistic regression analysis. In the whole cohort, glycated hemoglobin A1 (HbA1c) correlated with the ratio of early mitral inflow over early diastolic mitral annular tissue velocity (E/e´) ($r = 0.20$, $p<0.001$). The association remained significant in multivariate analysis adjusting for other significant covariables and when including patients with HbA1c <= 5% only. State of glucose metabolism was significantly associated with E/e´ in multivariate analysis as well. 6 minute walk distance decreased along the diabetic spectrum and was significantly correlated with E/e´ and grade of diastolic dysfunction.

Conclusions: Impaired glucose metabolism is associated with diastolic dysfunction along the whole spectrum of glucose metabolism states. Our data extend previous reports into the prediabetic and normal range. They may be relevant for preventive approaches, as no effective treatment has been identified for diastolic heart failure once established.